gai consultants

Phase II Environmental Site Assessment

CSX Trestle Property
Kanawha River Bridge No. 4557
Charleston, West Virginia

GAI Project E091390
August 2011

Submitted To: City of Charleston

Prepared By: GAI Consultants, Inc.
500 Summers Street, Third Floor
Charleston, West Virginia 25301

. . . transforming ideas into reality

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Executive Summary

The City of Charleston wishes to use an abandoned CSX railway as a rail trail for the surrounding community. In order to proceed with this plan, it is necessary to test the soil and groundwater for any chemicals of concern. The proposed sale area is 5.49 acres and has CSX Transportation, Inc. PIN numbers 54039 0087, 54039 0174, 54039 0175, and 54039 0176. In May 2004, a Phase I Environmental Site Assessment was conducted by Triad Engineering, Inc. (Triad) on behalf of CSX Real Property, Inc. This Phase I Environmental Site Assessment revealed potential evidence of recognized environmental conditions that could possibly be associated with former historic industrial and commercial land-uses of the adjoining and adjacent properties. However, no evidence was presented that the historic land-uses impacted the environmental quality at the site.

A limited Phase II Environmental Site Assessment (ESA) was performed in 2010 for a 1 acre piece of this property associated with parking for the new West Side Elementary School. Results of that assessment shows similar results to the findings of this report with the exception that elevated was also found. While not specifically included in this report the findings associated with this parking area are significant as it will be part of the property purchase. Actions taken on the West Side Elementary School include removal and disposal of some soils and capping of the site with asphalt. The location is currently in the Voluntary Remediation Program and is anticipated to be brought into agreed cleanup standards with the WVDEP.

The City of Charleston contracted with GAI Consultants, Inc. (GAI) to conduct a subsurface Phase II ESA as recommended by Triad. In order to determine the level of contamination of the site, nine soil borings and three monitoring wells were created. Samples from each boring and well were screened for potential chemicals of concern. Tests showed a select few chemicals reaching levels above the residential De Minimis concentration.

The Phase II ESA sampling results showed that Arsenic levels exceeded the residential De Minimis concentration at every boring site. It is anticipated that this is related to elevated but naturally occurring background levels on the on-site and surrounding soils. Creosote related components showed levels higher than the residential De Minimis concentrations in boring sites B-1-1A, B-1-1B, B-1-2, B-1-7, and B-1-8. There was also one instance where Selenium reached levels above the residential De Minimis concentrations in the B-1-2 boring site. Most of the chemicals of concern tested below the reporting limit.

1.0 Introduction

1.1 Purpose

The purpose of this Phase II ESA is to evaluate the recognized environmental conditions identified in the Phase I ESA performed by Triad Engineering in May 2004, for the purpose of providing sufficient information regarding the nature and extent of potential CERCLA and petroleum contamination on the CSX Trestle property. This Phase II ESA was performed in accordance with ASTM Standard E1903.

1.2 Geographic Location

The CSX Trestle property is a total of 5.49 acres located between Washington Street to the north side of the Kanawha River and MacCorkle Avenue to the south. The Trestle is approximately 4,400 feet in length and generally consists of a corridor that is 80 feet wide. This width fluctuates at both termination points of the structure to the South and North. Approximately 2,200 linear feet of the corridor is to the north of the river, 1,400 feet is south of the river, and 800 feet of truss supported rail line crosses the Kanawha River.

The project is located on the West Side of Charleston and is seperated into two sites, the North Site and the South Site. The North Site is bound to the North by Washington Street, to the South by the Kanawha River, to the West by Hunt Avenue, and to the East by Florida Street. The South Site is bound to the north by the Kanawha River, to the east and west by MacCorkle Avenue, and to the south by Interstate 64.

The site is currently an inactive rail line that has been out of service since the mid-1980's. It is a very flat site (2% +/-) that gently slopes to the north east, away from Hunt Avenue toward Park Avenue parallel with the Kanawha River. No surface water streams or regularly impounded water affects the Site. A Site Location Map labeled Figure 1 is attached in the appendices showing the physical location of the property.

1.3 General History and Land Use

The following history and land use information is based on the Phase I ESA completed in 2004 that was submitted with the VRP application for the West Side Elementary Site.

1.3.1 Historic Land Use

Based on various historic records, land-use at the Site has consisted of a mix of commercial, industrial, and residential uses from 1907 to the present. Overall, the north side of the Kanawha River has been used for residential and commercial purposes.

1.3.2 Current Land Use

The Site is currently owned by CSX Transportation, Inc. The Kanawha River Bridge and associated trestle track originally connected the CSX Transportation, Inc. double mainline track along the south side of the Kanawha River to the Norfolk Southern Corporation single mainline track to the north of the Kanawha River. The northern most portion of the CSX Transportation, Inc. track that had connected with the Norfolk Southern Corporation track has been removed. CSX Transportation, Inc. is not currently using the Site for active rail transportation purposes.

1.3.3 Anticipated Future Use

CSX Transportation, Inc. reportedly has offered to sell this unused land to the City of Charleston as a part of the rails-to-trails recreational development. The City of Charleston is currently considering this purchase.

1.3.4 Land Use of Adjacent Properties

Current and historic industrial and commercial land-use adjoining the Site to the North of the Kanawha River includes: (1) former and current warehousing and storage, (2) former and current automobile repair, (3) miscellaneous retailing and commercial operations, (4) office facilities, (5) former beer bottling and machine shop operations, and (6) current general contractor lay-down and vehicle storage areas. A former school and multiple residential areas are also located on properties adjoining the Site.

1.4 Geologic Conditions of the Site

The following geological information is based on the recent site sampling and the Phase I ESA completed in 2004 that was submitted with the VRP application for the West Site Elementary site.

Soil Characteristics

Soil at the site is classified as Udorthent Urban land complex (UC) according to The United States Department of Agriculture, Soil Conservation Service (SCS) Soil Survey of Kanawha County, West Virginia (1981). This type of soil is found in steep to nearly level areas that are uplands, terraces, or floodplains. Areas covered by buildings or man-made land cover that prevent soil classification make up the urban land component of this soil complex. Physical characteristics of the soil, such as drainage and permeability, tend to vary over a wide range and should be evaluated on a site-by-site basis.

Geologic Setting

The CSX trestle is located on the Quaternary alluvium of the Kanawha River. According to the West Virginia Geological and Economic Survey, Geologic Map of West Virginia (1968), the underlying geology at this site consists of Pennsylvanian age rock of the Conemaugh Series. The Conemaugh Series is formed primarily of thick units of shale and massive sandstone with a few limestone and coal seams spread throughout. The Conemaugh Series can be identified by the reddish color of the shale beds. These shale beds are commonly called "red beds." The red shale beds dominate the upper three-quarters of this series and can be seen outcropping along nearby sections of I-64.

1.5 Hydrologic Conditions at the Site

The following hydrogeological information is based on the recent site sampling and the Phase I ESA completed in 2004 that was submitted with the VRP application for the West Site Elementary site.

Hydrogeologic Setting

Based on our knowledge and understanding of the subsurface geology and hydrology at this portion, the overlying unconsolidated Quaternary alluvium consists of clay, silt, and sand sized particles in alternating layers. The thickness of the alluvium ranges from approximately 45-feet to 60-feet and lies on top of fractured bedrock. Relatively shallow groundwater is often encountered in this overlying material. The confined to semi-confined groundwater potentiometric surface is expected to be encountered at a range of 20-30 feet below the surface, most commonly found in the silty sand to sand layer. The flow of the groundwater would be toward the Kanawha River, which would represent both the local and regional base level at the site. After testing the soil, sample data indicated that the first two feet consisted of silty clay

Flood Plain

A site-specific flood plain evaluation with associated surveying and elevation certification was not within the scope of work for the original Phase I Environmental Site Assessment project. However, information provided by EDR in the Geocheck® portion of the environmental database records review indicates that portions of the site are located within the boundaries of the 100-year and 500-year flood plains of the Kanawha River, as mapped by the Federal Emergency Management Agency (FEMA). The FEMA flood plain panel for the site is 5400730004C.

Wetlands

A site-specific wetlands evaluation with associated field delineation was not within the scope of work for the original Phase I Environmental Site Assessment project. However, based on information provided by EDR in the Geocheck® portion of the environmental database records review, no "Federal Wetlands" are present at the site. EDR accessed the United States Fish & Wildlife Service, National Wetland Inventory (NWI) to identify mapped "Federal Wetlands."

2.0 Site Investigation

2.1 Current Investigation

GAI conducted site sampling on May 18th and 19th, 2011. A summary of that investigation follows:

Sampling at the site occurred on Wednesday and Thursday May 18th-19th, 2011. Weather was cloudy on both days with temperatures ranging from 55 to 85 degrees Fahrenheit. A meeting was conducted at the start of the day to go over safety protocol for the site and the sampling and analysis plan. Enviroprobe Integrated Solutions supplied the Geoprobe technology that was used to take soil and groundwater samples.

Nine boring sites were created along the trestle using either truck mounted drilling with split spoon sampling or Geoprobe technology. Originally, the sample plan had eight boring sites and three monitoring wells. Boring B-1-3, which was originally planned to be a monitoring well (MW-1), was drilled as a boring, thus creating a ninth boring. Monitoring well, MW-1, was drilled adjacent to the new boring location. Four borings (B-1-1A, B-1-3, B-1-6, and B-1-8) were chosen to be drilled to a depth of 5 feet and soil samples were obtained from the soil profile approximately 4 to 6 inches below the ground surface. Five borings (B-1-1B, B-1-2, B-1-4, B-1-5, and B-1-7) were chosen to be drilled to a depth of 10 feet, soil samples were obtained from the soil profile approximately 4 to 6 inches below the ground surface and at depth (2-10 feet). Boring B-1-4 was chosen because it is the location of a former fire.

Work began at the southern end of the site at B-1-6 nearest 2nd Avenue at approximately 7:30am . Soil sampling then moved to B-1-5, B-1-4, B-1-3, B-1-2, B-1-1B, and then to B-1-1A.

Temporary monitoring well MW-1 was installed near B-1-3. The well was completed by using a 10-slot screen. Groundwater was encountered at a depth of approximately 29 feet below the surface. A water sample was obtained approximately 24 hours after completion using hand bailers.

Temporary monitoring well MW-2 was then installed near B-1-6. The well was completed by using a 10-slot screen. Groundwater was encountered at a depth of approximately 24 feet below the surface. A water sample was obtained approximately 24 hours after completion using hand bailers.

Work on the first day completed upon completion of the monitoring wells. Soil samples were packed in ice and the cooler sealed.

A Multi Ray Plus Photoionization Detector (PID) was utilized to screen all soil samples taken from all of the geoprobe and well holes. One field screening sample was taken for each 4 feet of probed soil with a minimum of 1 sample for each acetate sleeve of soil obtained. this procedure also followed during installation of the monitoring wells eventhough laboratory soil samples were not obtained from the well holes. No hits were identified by the PID in any of the soil or groundwater monitoring field screening samples.

Starting at 7:30am the following day, work began in the center of the site at boring B-1-7 near 2nd Avenue. Soil sampling continued to boring B-1-8. Temporary monitoring well MW-3 was installed between B-1-7 and B-1-8. The well was completed by using a 10-slot screen. Groundwater was encountered at a depth of approximately 27 feet below the surface. A water sample was obtained approximately 30 minutes after completion using hand bailers.

Water samples were collected from all three wells. Water and soil sampling was completed at 4:30pm and GAI demobilized from the site. Samples were packed in ice and the cooler sealed. Samples were delivered to Pace Analytical in Pittsburgh by GAI staff.

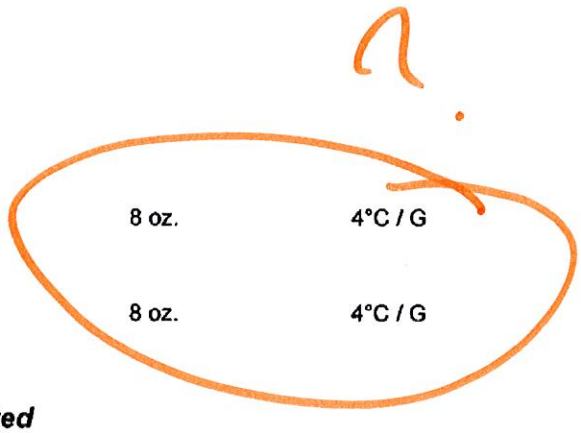
2.1.1 Soils

GAI tested for RCRA metals, VOC's, and SVOC's at the site. The VOC and SVOC list contained primary constituents of herbicides that were of interest. Location of the soil borings are shown on the attached Figure 2. B-1-1B, B-1-2, B-1-4, B-1-5, and B-1-7 were sampled at the surface from 0 to 2 feet and again at 10 feet below the surface. Samples B-1-1A, B-1-3, B-1-6, and B-1-8 were taken at the surface from 0 to 2 feet only. As a general rule, GAI's surface sample was taken at 4 to 8 inches below the surface, just under the topsoil layer.

Soil samples were obtained using a Geoprobe direct push sampling rig and micro core sampler. Soil samples were collected in and then retrieved from acetate liners and placed in sample bottles or similar containers as required to be sent for analysis. The soil boreholes were immediately abandoned in accordance with regulatory requirements. Each 4 foot length of soil recovered was field screened using a Photo Ionization Detector (PID).

2.1.1.1 Chemicals Analyzed

TABLE 1 SOIL SAMPLING INFORMATION			
Sample #	Sample Interval	Sample Type	Potential Contaminants
B-1-1A	0-2 feet	Soil	SVOC's, VOC's, RCRA Metals (Total)
B-1-1B	0-2 feet	Soil	SVOC's, VOC's, and RCRA Metals (Total)
B-1-1B	2-10 feet	Soil	SVOC's, VOC's, RCRA Metals (Total
B-1-2	0-2 feet	Soil	SVOC's, VOC's, RCRA Metals (Total)
B-1-2	2-10 feet	Soil	SVOC's, VOC's, and RCRA Metals (Total)
B-1-3	0-2 feet	Soil	SVOC's, VOC's, RCRA Metals (Total)
B-1-4	0-2 feet	Soil	SVOC's, VOC's, RCRA Metals (Total)
B-1-4	2-10 feet	Soil	SVOC's, VOC's, RCRA Metals (Total)
B-1-5	0-2 feet	Soil	SVOC's, VOC's, RCRA Metals (Total)
B-1-5	2-10 feet	Soil	SVOC's, VOC's, and RCRA Metals (Total)
B-1-6	0-2 feet	Soil	SVOC's, VOC's, RCRA Metals (Total)
B-1-7	0-2 feet	Soil	SVOC's, VOC's, and RCRA Metals (Total)



2.1.1.2 Chemicals Detected

A variety of the chemicals were detected in very low concentrations, most were below the residential and industrial De Minimis concentrations. Appendix A contains a Summary Table A which provides a total listing of the sampling results. Samples that had a recognized result are

hi-lighted in red if they are above the residential De Minimis concentration, bolded if they are above the industrial De Minimis concentration, and highlighted yellow if they were detected but below the De Minimis concentration.

Appendix B contains the laboratory sheets upon which Table A is based.

Section 2.1.1.3 below provides a summary of the chemicals of potential concern.

2.1.1.3 Comparison of Chemicals of Potential Concern to Screening Criteria

Results of the soil sampling indicated concentrations above the residential De Minimis concentration for several parameters as listed below:

- *Arsenic* - B-1-1A, B-1-1B, B-1-2, B-1-3, B-1-4, B-1-5, B-1-6, B-1-7, and B-1-8 (at the surface 0-2 ft and at depth 2-10 ft)
- *Selenium* - B-1-2 (at the surface 0-2 ft)
- *Benzo(a)anthracene* - B-1-1A, B-1-7, and B-1-8 (at the surface 0-2 ft)
- *Benzo(a)pyrene* - B-1-1A, B-1-7, and B-1-8 (at the surface 0-2 ft)
- *Benzo(a)flouranthene* - B-1-1A, B-1-1-B, B-1-2, B-1-7, and B-1-8 (at the surface 0-2 ft)
- *Benzo(g,h,i)perylene* - B-1-1A, and B-1-8 (at the surface 0-2 ft)
- *Dibenz(a,h)anthracene* - B-1-8 (at the surface 0-2 ft)
- *Indeno(1,2,3-cd)pyrene* - B-1-1A, and B-1-8 (at the surface 0-2 ft)

Results of the soil sampling indicated concentrations above the industrial De Minimis concentration for the following parameter:

- *Benzo(a)pyrene* - B-1-8 (at the surface 0-2 ft)

Please refer to Soils - Chemical Results table in Appendix A.

2.1.2 Groundwater

GAI tested for RCRA Metals, VOCs, and SVOCs in three wells (MW-1, MW-2, and MW-3) at the site. The location of the temporary monitoring wells is shown on Figure 2.

Groundwater samples were obtained from temporary groundwater monitoring wells consisting of a 1.5 inch PVC casing with slotted sections in the water table zone. Samples were collected using a disposable Teflon bailer. Each sample was field filtered prior to filling the sample containers. A new bailer was used at each location.

2.1.2.1 Chemicals Analyzed

TABLE 3 GROUNDWATER SAMPLING INFORMATION

Sample #	Sample Depth	Sample Type	Potential Contaminants
MW #1	32.11 feet	Ground Water	SVOC's, VOC's, RCRA Metals (Dissolved)
MW #2	25.36 feet	Ground Water	SVOC's, VOC's, RCRA Metals (Dissolved)
MW #3	27 feet	Ground Water	SVOC's, VOC's, RCRA Metals (Dissolved)

TABLE 4 GROUNDWATER SAMPLE METHODOLOGY

Parameters	Analytical Method	Volume Required	Preservative/ Container	Holding Time
SOIL SAMPLES				
Inorganics				
Metals (including Hg)	SW846 6010/7470A	500 mls	HN03 to pH < 2 Cool, 4°C / P,G	6 months (28 days for Hg)
Organics				
Volatiles	SW846 8260B	3 – 40 mls	HCl to pH<2; Cool, 4°C / G, Teflon-lined, septa cap	14 days
Semivolatiles	SW846 8270C	2 liters	Cool, 4°C / G	7 days until extraction, 40 days after extraction.
Herbicides		2 liters	Cool ,4°C / G	7 days until days after extraction.

2.1.2.2 Chemicals Detected

A small variety of chemicals were detected in low concentrations in monitoring wells MW-1, MW-2, and MW-3, most were below the groundwater De Minimis concentration. Appendix A contains a summary table of the groundwater sampling results.

Appendix B contains the laboratory sheets upon which Table A is based.

Section 2.1.2.3 below provides a summary of the chemicals of potential concern.

2.1.2.3 Comparison of Chemicals of Potential Concern to Screening Criteria

Results of the groundwater sampling indicated concentrations above the groundwater De Minimis concentrations for several parameters as listed below:

- *Barium* - MW-3
- *Carbon Tetrachloride* - MW-2
- *Chloroform* - MW-1 and MW-2

2.2 Summary of Chemicals of Concern

Chemicals of concern were relatively limited at this site and in moderate to low concentrations. While there were several contaminants identified above the De Minimis concentrations at several locations, there were no significant "hot spots" identified.

2.2.1 Soils

Selenium was detected above the residential De Minimis concentrations at the surface (0-2 feet) in 1 of the 8 borings installed around the train trestle (boring B-1-2). No selenium was detected above De Minimis concentrations in any of the other 7 borings.

Benzo(a)anthracene, Benzo(a)pyrene, Benzo(a)flouranthene, Benzo(g,h,i)perylene, Dibenz(a,h)anthracene, and Indeno(1,2,3-cd)pyrene, all components of creosote, were identified above the De Minimis concentration in 5 of the 7 borings installed around the train trestle.

The most significant finding of the soil sampling program was the identification of arsenic above the De Minimis concentration of 0.39 mg/kg for soil in all 8 soil borings at the surface (0-2 feet). Results ranged from 3.3 to 25.3 mg/kg with the highest concentration being in the vicinity of B-1-1A, B-1-1B and B-1-8. In addition, the arsenic level was also exceeded in all 4 of the borings extended from 2 to 10 feet below the surface. Results of these deeper samples ranged from 3.2 to 6 mg/kg.

While it is not uncommon to encounter arsenic on railroad property, West Virginia has a relatively high background level of arsenic ranging from 1.1 to 89 mg/kg. All of the sample results are below West Virginia's background arsenic level.

2.2.2 Groundwater

Of the 8 metal parameters analyzed, only 1 was detected above the groundwater De Minimis concentrations. Barium was detected in 1 of the 3 monitoring wells installed around the train trestle (MW-3), the concentration was 354 ug/L.

Of the 43 volatile compound parameters analyzed, only 2 were detected above the groundwater De Minimis concentration. Carbon tetrachloride was detected in 1 of the 3 monitoring wells installed around the train trestle (MW-2) , the concentration was 20.1 ug/L. Chloroform was detected in 2 of the 3 monitoring wells installed around the train trestle (MW-1 and MW-2), the

concentrations were 1 and 5.7 ug/L respectively. Carbon tetrachloride and chloroform exceedances could be attributed to current and historic uses of the property and adjacent properties. Soil borings located directly adjacent to both monitoring wells MW-1 and MW-2 did not indicate either parameter leading GAI to believe that the carbon tetrachloride and chloroform contamination could be from an off-site source.

Of the 68 semi-volatile compound parameters analyzed, none were detected above the groundwater De Minimis concentration.

3.0 Conclusions and Recommendations

3.1 Summary

The proposed Site is located on the ancient alluvium of the Kanawha River on the West Side of Charleston between Washington Street to the north side of the Kanawha River and MacCorkle Avenue to the south. Extensive research of the property has indicated that the property has historically been used for railroad right-of-way since the first decade of the 1900's. There is no physical indication of other industrial uses and literature research revealed no other uses of concern.

Sampling at the site identified several chemicals of concern that will need to be addressed as they exceed the residential De Minimis concentration screening level.

For soils this included:

- *Arsenic* - B-1-1A, B-1-1B, B-1-2, B-1-3, B-1-4, B-1-5, B-1-6, B-1-7, and B-1-8 (at the surface 0-2 ft and at depth 2-10 ft)
- *Selenium* - B-1-2 (at the surface 0-2 ft)
- *Benzo(a)anthracene* - B-1-1A, B-1-7, and B-1-8 (at the surface 0-2 ft)
- *Benzo(a)pyrene* - B-1-1A, B-1-7, and B-1-8 (at the surface 0-2 ft)
- *Benzo(a)flouranthene* - B-1-1A, B-1-1-B, B-1-2, B-1-7, and B-1-8 (at the surface 0-2 ft)
- *Benzo(g,h,i)perylene* - B-1-1A, and B-1-8 (at the surface 0-2 ft)
- *Dibenz(a,h)anthracene* - B-1-8 (at the surface 0-2 ft)
- *Indeno(1,2,3-cd)pyrene* - B-1-1A, and B-1-8 (at the surface 0-2 ft)

For groundwater this included:

- *Barium* - MW-3
- *Carbon Tetrachloride* - MW-2
- *Chloroform* - MW-1 and MW-2

Detailed comparison tables can be found in Appendix A.

Continuous PID readings were taken on the soil as the borings B-1-1A through B-1-8 were advanced and as temporary monitoring wells MW-1 through MW-3 were installed. No recognized hits of volatiles or semi-volatiles were recorded during filed screening.

3.2 Conclusions

The site does contain some minor levels of chemicals of concern that will most likely require action as they exceed the residential and groundwater (as applicable) De Minimis concentration standard. Most of these chemicals were anticipated at the onset of this sampling program.

1. Preliminary estimates are that 1 to 2.25 acres of the parcel may need soil removal, provided a risk assessment is not successful in showing contaminant levels are acceptable for recreational use.
2. With the exception of arsenic, all of the chemicals of concern in soil appear to be shallow. based upon the shallow depth of the GAI surface samples (4"-8" typ.) GAI believes most of this surface contamination can be removed with the excavation of soil to a depth of 12".
3. Disposal of soil at a local solid waste landfill is probable as contaminant levels are not in the hazard range. It is estimated that approximately 2,500 to 5,000 tons of soil will need to be disposed of if the top 12" of soil is remove from a 1 to 2.25 acre area. Disposal costs $40/ton are estimated at $100,000 to $225,000. Excavation and hauling costs are estimated at $25,000 to $75,000.

3.3 Recommendations

To more accurately quantify the volume of potentially impacted soil additional sampling will be necessary. Based on the data obtained from the initial sampling program, GAI provides the following preliminary recommendations:

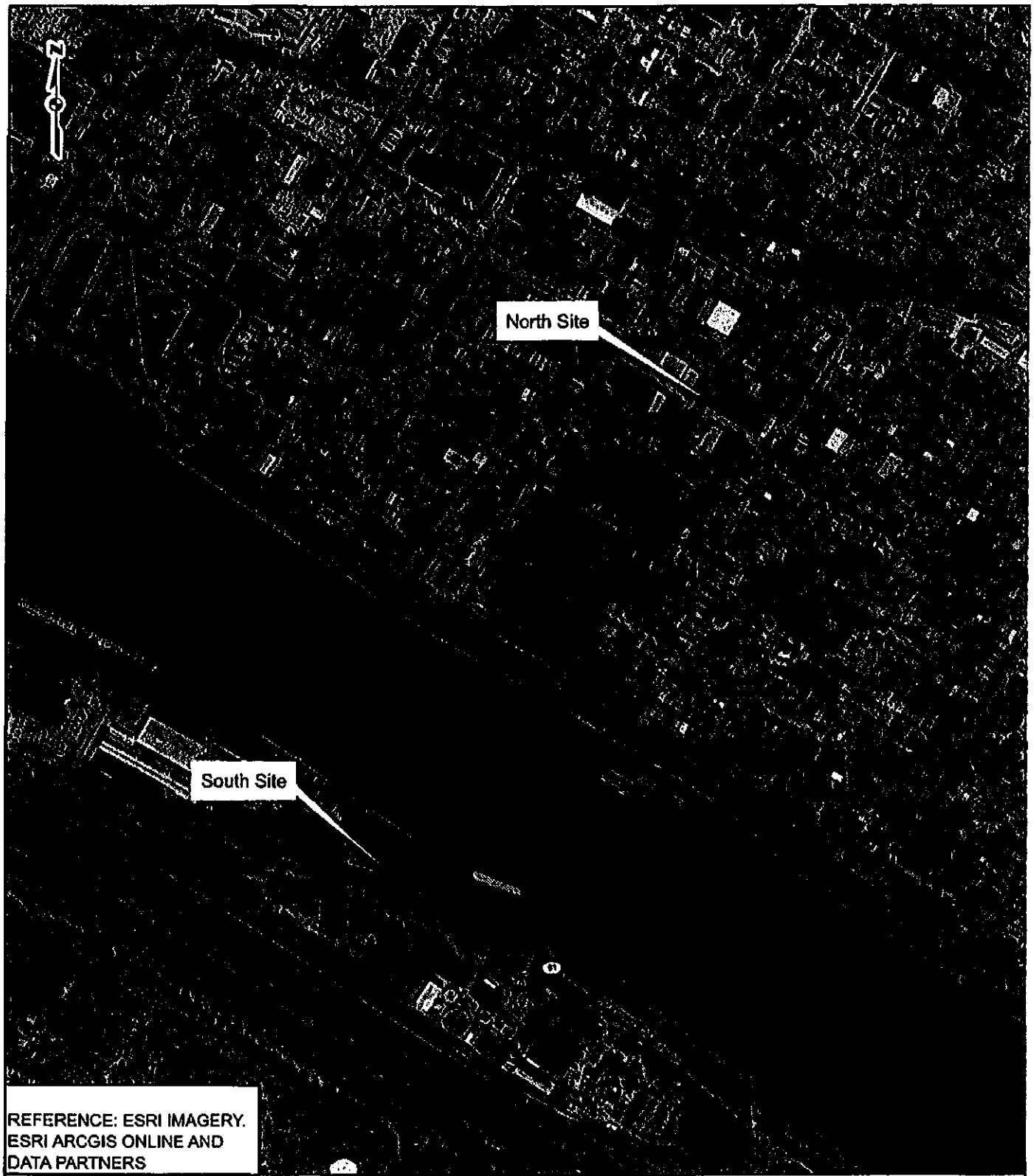
1. A risk assessment of contaminant levels is recommended and required as part of the Voluntary Remediation Program administered by the WVDEP. Contact the WVDEP to unofficially discuss the findings of this report and get recommendations regarding what they would expect to see should the City decide to proceed with purchase and bring the property into the West Virginia Voluntary Remediation Program. GAI strongly recommends pursuing this avenue as the reduction in long term liability from receiving site approval from the WVDEP under this program is well worth the additional sampling, risk assessment and report generation necessary.
2. Additional soil sampling, primarily at shallow depths and at spacing intervals between borings conducted for this initial report should be performed to more accurately quantify the volume of impacted soil, limits of impact and concentration levels of chemicals of concern. A reduced suite of test parameters to cover chemicals of concern identified in this first stage of sampling is warranted.
3. Arsenic levels are believed to be within the normal background level of native soils in West Virginia with the possible exception of boring B-1-8 located on the south side of MacCorkle Avenue closest to the CSX tracks. Additional focus, particularly with regard to arsenic in the vicinity of B-1-8 is warranted as it may be associated with the active

railway or the former adjacent land use as a tannery. Based upon results of follow up sampling the area around B-1-8 should be analyzed regarding its projected long term use (no at grade trail is anticipated at this time, only elevated trail) and delineated in planning documents as an area not for pedestrian use.

4. Follow up sampling of the groundwater wells is recommended to determine if levels of chloroform and carbon tetrachloride are still present in MW-#1 and MW-#2. It is not uncommon to have occasional single hits of unexpected compounds.

Need Summary of ALL COSTS!

FIGURES



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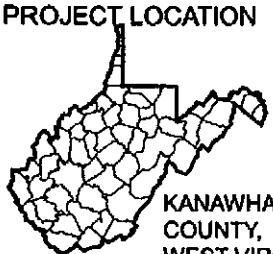
PROJECT LOCATION



KANAWHA COUNTY, WEST VIRGINIA

LEGEND

Project Location

0 250 500 1,000 Feet

FIGURE 1
PROJECT LOCATION MAP

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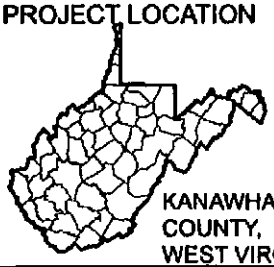
PHASE II ENVIRONMENTAL SITE ASSESSMENT

DRAWN BY: KEC DATE: 8/24/2011
CHECKED: KEC APPROVED: JAH

P:\CWV\2009\E091390 - Charleston - CSX Trestle Property VRP\Documents\Reports\PROJECT_LOCATION_MAP_08242011.mxd

REFERENCE: ESRI IMAGERY. ESRI ARCGIS ONLINE AND DATA PARTNERS.

PROJECT LOCATION



KANAWHA COUNTY, WEST VIRGINIA

LEGEND

- Monitoring Well
- Soil Boring

0 125 250 500 Feet

FIGURE 2
SAMPLE LOCATION MAP

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PHASE II ENVIRONMENTAL SITE ASSESSMENT

DRAWN BY: KEC DATE: 8/24/2011
CHECKED: KEC APPROVED: JAH

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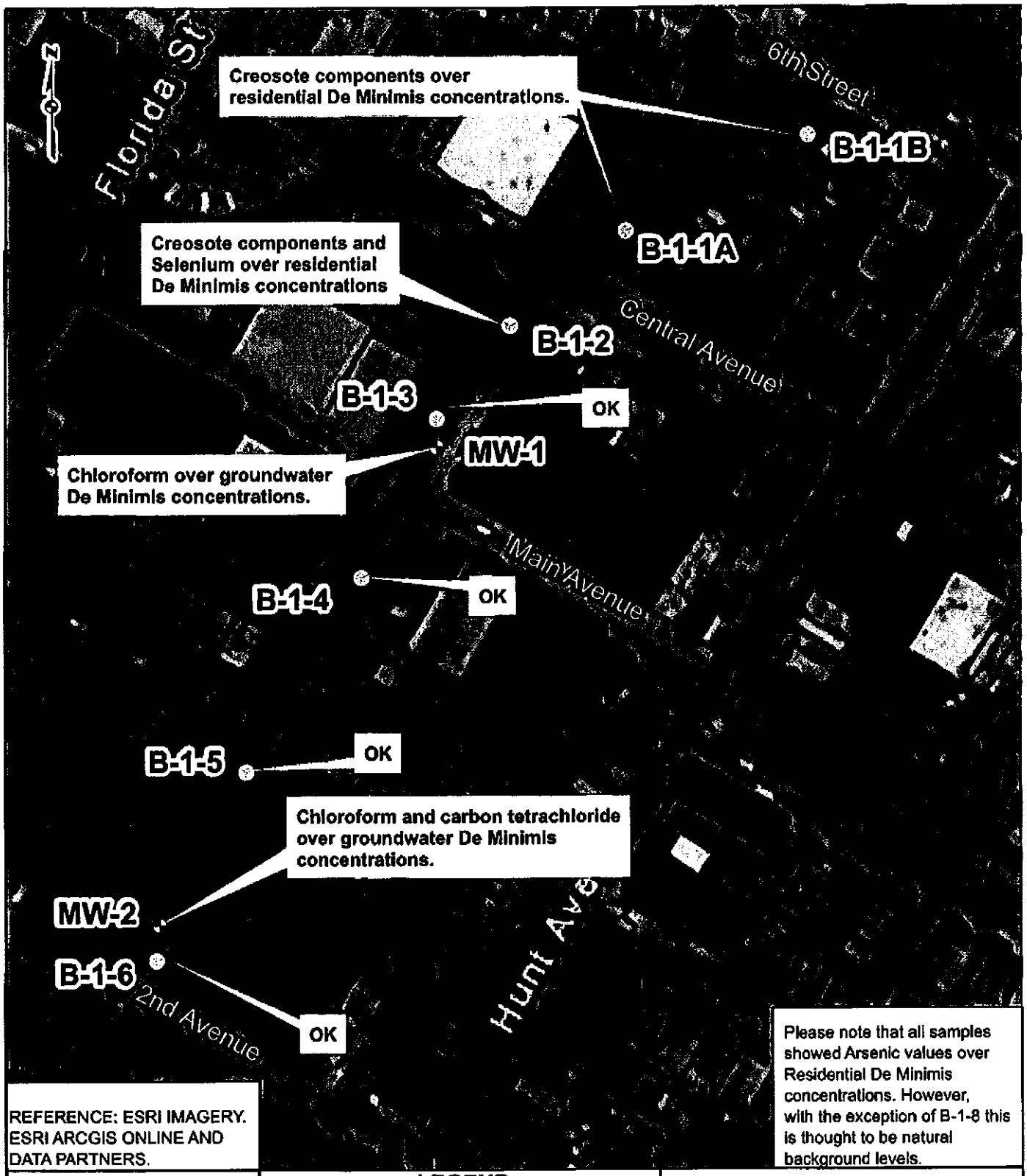
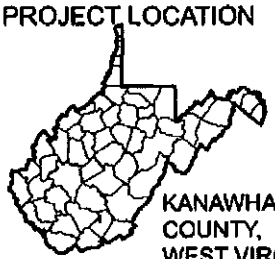


REFERENCE: ESRI IMAGERY. ESRI ARCGIS ONLINE AND DATA PARTNERS.

Please note that all samples showed Arsenic values over Residential De Minimis concentrations. However, with the exception of B-1-8 this is thought to be natural background levels.

PROJECT LOCATION



KANAWHA COUNTY, WEST VIRGINIA

LEGEND

- Monitoring Well
- Soil Boring

0 50 100 200 Feet

FIGURE 3
SAMPLE RESULTS NORTH MAP

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PHASE II ENVIRONMENTAL SITE ASSESSMENT

DRAWN BY: KEC DATE: 8/24/2011
CHECKED: KEC APPROVED: JAH

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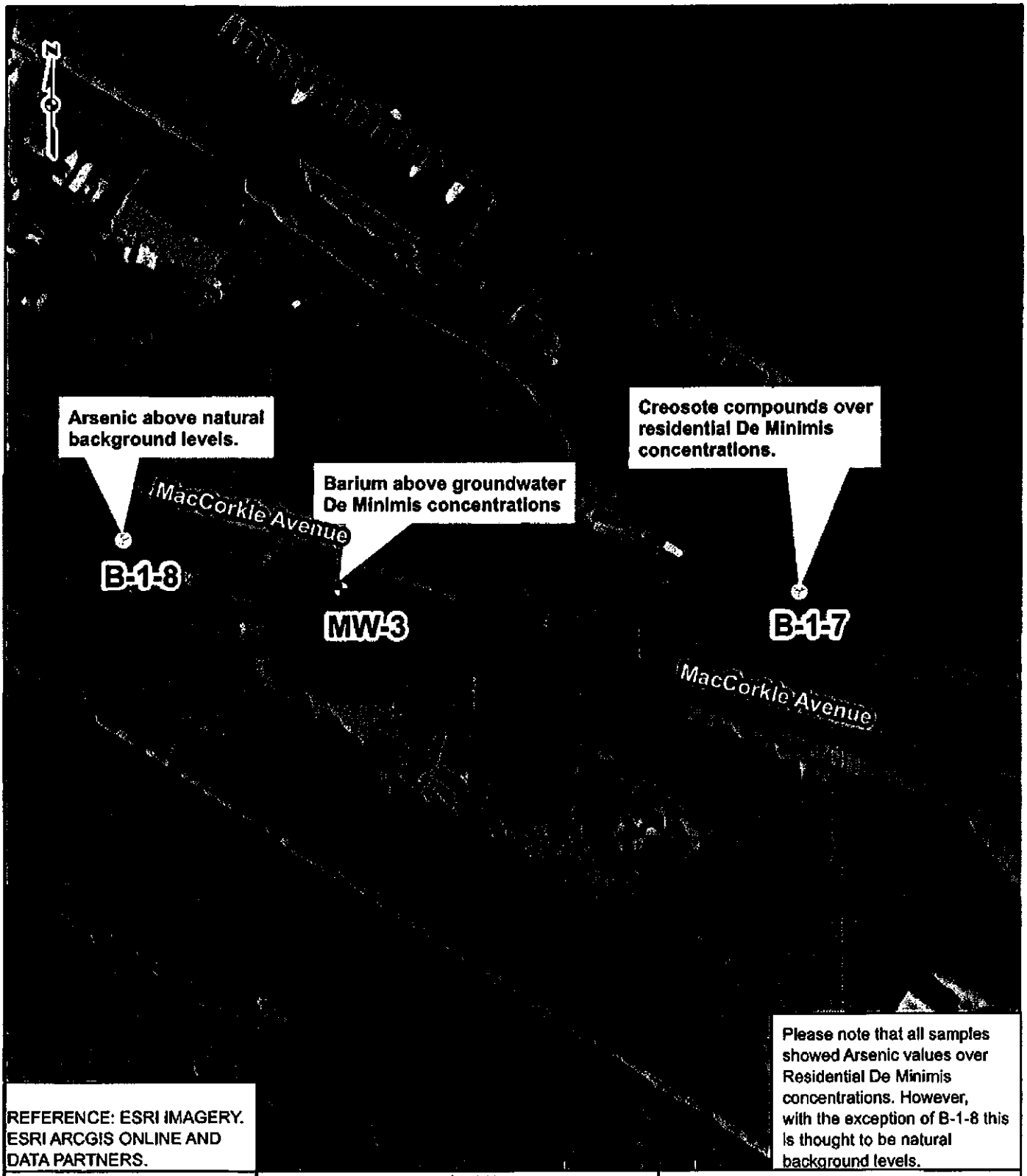

Please note that all samples showed Arsenic values over Residential De Minimis concentrations. However, with the exception of B-1-8 this is thought to be natural background levels.

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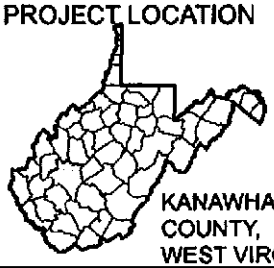
PROJECT LOCATION



KANAWHA COUNTY, WEST VIRGINIA

LEGEND

- Monitoring Well
- Soil Boring

0 50 100 200 Feet

FIGURE 4
SAMPLE RESULTS SOUTH MAP

gai consultants

PHASE II ENVIRONMENTAL SITE ASSESSMENT

DRAWN BY: KEC DATE: 8/24/2011
CHECKED: KEC APPROVED: JAH

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APPENDICES

APPENDIX A

Sampling Data Results Summary Tables

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Chemical of Concern	Residential De Minimis	Industrial De Minimis	Units	B-1-1A (0-2 ft)	B-1-1B (0-2 ft)	B-1-1B (2-10 ft)	B-1-2 (0-2 ft)
Metals							
Arsenic	0.39	27	mg/kg	7.2	7.9	6	4.6
Barium	15000	290000	mg/kg	66.3	293	54.2	132
Cadmium	39	1000	mg/kg	>0.28	>0.29	>0.22	0.32
Chromium	210	4500	mg/kg	19.9	15.4	11.4	7.3
Lead	400	1000	mg/kg	62.3	67.7	13.3	334
Selenium	390	10000	mg/kg	>0.75	9.4	>0.59	710
Silver	390	10000	mg/kg	>0.56	>0.58	>0.44	>0.44
Mercury	23	610	mg/kg	0.17	>0.13	>0.11	>0.11
Volatile Organic Compounds							
Acetone	14000	56000	mg/kg	0.152	0.853	0.0552	0.0995
Benzene	0.66	15	mg/kg	>0.009	>0.0106	>0.0058	>0.0065
Bromodichloromethane	1	24	mg/kg	>0.009	>0.0106	>0.0058	>0.0065
Bromoform	61	3100	mg/kg	>0.009	>0.0106	>0.0058	>0.0065
Bromomethane	3.9	13	mg/kg	>0.009	>0.0106	>0.0058	>0.0065
Total BTEX	--		mg/kg	>0.0539	>0.0634	>0.0346	>0.0392
2-Butanone (MEK)	22000	56000	mg/kg	>0.018	0.052	>0.0115	>0.0131
Carbon disulfide	360	470	mg/kg	0.01	>0.0106	>0.0058	>0.0065
Carbon tetrachloride	0.24	1200	mg/kg	>0.009	>0.0106	>0.0058	>0.0065
Chlorobenzene	130	310	mg/kg	>0.009	>0.0106	>0.0058	>0.0065
Chloroethane	3	65	mg/kg	>0.009	>0.0106	>0.0058	>0.0065
Chloroform	0.25	5.2	mg/kg	>0.009	>0.0106	>0.0058	>0.0065
Chloromethane	48	160	mg/kg	>0.009	>0.0106	>0.0058	>0.0065
Dibromochloromethane	7.6	680	mg/kg	>0.009	>0.0106	>0.0058	>0.0065
1,2-Dichlorobenzene	150	150	mg/kg	>0.009	>0.0106	>0.0058	>0.0065
1,3-Dichlorobenzene	35	130	mg/kg	>0.009	>0.0106	>0.0058	>0.0065
1,4-Dichlorobenzene	2	45	mg/kg	>0.009	>0.0106	>0.0058	>0.0065
1,1-Dichloroethane	610	1600	mg/kg	>0.009	>0.0106	>0.0058	>0.0065
1,2-Dichloroethane	0.35	7.7	mg/kg	>0.009	>0.0106	>0.0058	>0.0065
1,2-Dichloroethene (Total)			mg/kg	>0.018	>0.0211	>0.0115	>0.0131
1,1-Dichloroethene	130	430	mg/kg	>0.009	>0.0106	>0.0058	>0.0065
cis-1,2-Dichloroethene	43	150	mg/kg	>0.009	>0.0106	>0.0058	>0.0065
trans-1,2-Dichloroethene	54	180	mg/kg	>0.009	>0.0106	>0.0058	>0.0065
1,2-Dichloropropane	0.64	14	mg/kg	>0.009	>0.0106	>0.0058	>0.0065
cis-1,3-Dichloropropene	0.7	16	mg/kg	>0.009	>0.0106	>0.0058	>0.0065
trans-1,3-Dichloropropene	0.7	16	mg/kg	>0.009	>0.0106	>0.0058	>0.0065
Ethylbenzene	110	110	mg/kg	>0.009	>0.0106	>0.0058	>0.0065
2-Hexanone	8900	8900	mg/kg	>0.018	>0.0211	>0.0115	>0.0131
Methylene Chloride	8.9	210	mg/kg	>0.009	>0.0106	>0.0058	>0.0065
4-Methyl-2-pentanone (MIBK)	85	85	mg/kg	>0.018	>0.0211	>0.0115	>0.0131
Methyl-tert-butyl ether	150	11000	mg/kg	>0.009	>0.0106	>0.0058	>0.0065
Styrene	630	630	mg/kg	>0.009	>0.0106	>0.0058	>0.0065
1,1,2,2-Tetrachloroethane	3	71	mg/kg	>0.009	>0.0106	>0.0058	>0.0065
Tetrachloroethene	0.56	19	mg/kg	>0.009	>0.0106	>0.0058	>0.0065
Toluene	260	260	mg/kg	>0.009	>0.0106	>0.0058	>0.0065
1,1,1-Trichloroethane	710	710	mg/kg	>0.009	>0.0106	>0.0058	>0.0065
1,1,2-Trichloroethane	0.84	19	mg/kg	>0.009	>0.0106	>0.0058	>0.0065

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Water - Chemical Results
City of Charleston CSX Trestle

Chemicals of Concern	De Minimis	Units	MW-1	MW-2	MW-3
Metals					
Arsenic, Dissolved	10	ug/L	>5	>5	>5
Barium, Dissolved	200	ug/L	107	77	354
Cadmium, Dissolved	5	ug/L	>3	>3	>3
Chromium, Dissolved	110	ug/L	>5	>5	>5
Lead, Dissolved	15	ug/L	>5	>5	>5
Selenium, Dissolved	50	ug/L	>8	>8	>8
Silver, Dissolved	180	ug/L	>6	>6	>6
Mercury, Dissolved	2	ug/L	>0.2	>0.2	>0.2
Volatile Compounds					
Acetone	5500	ug/L	>10	>10	>10
Benzene	5	ug/L	>1	>1	>1
Bromochloromethane	0.8	ug/L	>1	>1	>1
Bromodichloromethane	0.18	ug/L	>1	>1	>1
Bromoform	8.5	ug/L	>1	>1	>1
Bromomethane	8.7	ug/L	>1	>1	>1
2-Butanone (MEK)	7000	ug/L	>10	>10	>10
Carbon disulfide	1000	ug/L	>1	>1	>1
Carbon tetrachloride	5	ug/L	1.5	20.1	>1
Chlorobenzene	100	ug/L	>1	>1	>1
Chloroethane	3.9	ug/L	>1	>1	>1
Chloroform	0.17	ug/L	1	5.7	>1
Chloromethane	190	ug/L	>1	>1	>1
Dibromochloromethane	0.8	ug/L	>1	>1	>1
1,2-Dichlorobenzene	600	ug/L	>1	>1	>1
1,3-Dichlorobenzene	600	ug/L	>1	>1	>1
1,4-Dichlorobenzene	75	ug/L	>1	>1	>1
1,1-Dichloroethane	910	ug/L	>1	>1	>1
1,2-Dichloroethane	5	ug/L	>1	>1	>1
1,2-Dichloroethane (Total)	0	ug/L	>2	>2	>2
1,1-Dichloroethane	910	ug/L	>1	>1	>1
cis-1,2-Dichloroethene	70	ug/L	>1	>1	>1
trans-1,2-Dichloroethene	100	ug/L	>1	>1	>1
1,2-Dichloropropane	5	ug/L	>1	>1	>1
cis-1,3-Dichloropropene	100	ug/L	>1	>1	>1
trans-1,3-Dichloropropene	400	ug/L	>1	>1	>1
Ethylbenzene	700	ug/L	>1	>1	>1
2-Hexanone	0	ug/L	>10	>10	>10
Methylene Chloride	5	ug/L	>1	>1	>1
4-Methyl-2-pentanone (MIBK)	6300	ug/L	>10	>1	>10
Methyl-tert-butyl ether	17	ug/L	>1	>1	>1
Styrene	100	ug/L	>1	>1	>1
1,1,2,2-Tetrachloroethane	0.055	ug/L	>1	>1	>1
Tetrachlorethene	5	ug/L	>1	>1	>1

Project E091380

Water - Chemical Results
City of Charleston CSX Trestle

Chemicals of Concern	De Minimis	Units	MW-1	MW-2	MW-3
Toluene	1000	ug/L	>1	>1	>1
1,2,4-Trichlorobenzene	70	ug/L	>1	>1	>1
1,1,1-Trichloroethane	200	ug/L	>1	>1	>1
1,1,2-Trichloroethane	5	ug/L	>1	>1	>1
Trichloroethene	5	ug/L	>1	>1	>1
Vinyl chloride	2	ug/L	>1	>1	>1
Xylene (Total)	10000	ug/L	>3	>3	>3
m&p-Xylene	0	ug/L	>2	>2	>2
o-Xylene	0	ug/L	>1	>1	>1
Semi Volatiles					
Acenaphthene	370	ug/L	>1.4	>1.4	>1.4
Acenaphthylene	370	ug/L	>1.4	>1.4	>1.4
Anthracene	1800	ug/L	>1.4	>1.4	>1.4
Azobenzene	0.1	ug/L	>1.4	>1.4	>1.4
Benzo(a)anthracene	0.092	ug/L	>1.4	>1.4	>1.4
Benzo(a)pyrene	0.002	ug/L	>1.4	>1.4	>1.4
Benzo(b)fluoranthene	0.092	ug/L	>1.4	>1.4	>1.4
Benzo(g,h,i)perylene	1100	ug/L	>1.4	>1.4	>1.4
Benzo(k)fluoranthene	0.092	ug/L	>1.4	>1.4	>1.4
Benzoic Acid	150000	ug/L	>143	>137	>138
Benzyl Alcohol	18000	ug/L	>1.4	>1.4	>1.4
4-Bromophenylphenyl ether	80	ug/L	>1.4	>1.4	>1.4
Butylbenzylphthalate	7300	ug/L	>1.4	>1.4	>1.4
Carbazole	3.4	ug/L	>1.4	>1.4	>1.4
4-Chloro-3-methylphenol	80	ug/L	>1.4	>1.4	>1.4
4-Chloraniline	150	ug/L	>1.4	>1.4	>1.4
bis(2-Chloroethoxy)methane	80	ug/L	>1.4	>1.4	>1.4
bis(2-Chloroethyl) ether	80	ug/L	>1.4	>1.4	>1.4
bis(2-Chloroisopropyl)ether	0.27	ug/L	>1.4	>1.4	>1.4
2-Chloronaphthalene	0	ug/L	>1.4	>1.4	>1.4
2-Chlorophenol	30	ug/L	>1.4	>1.4	>1.4
4-Chlorophenylphenyl ether	80	ug/L	>1.4	>1.4	>1.4
Chrysene	9.2	ug/L	>1.4	>1.4	>1.4
Dibenz(a,h)anthracene	9.2	ug/L	>1.4	>1.4	>1.4
Dibenzofuran	37	ug/L	>1.4	>1.4	>1.4
1,2-Dichlorobenzene	600	ug/L	>1.4	>1.4	>1.4
1,3-Dichlorobenzene	600	ug/L	>1.4	>1.4	>1.4
1,4-Dichlorobenzene	75	ug/L	>1.4	>1.4	>1.4
3,3'-Dichlorobenzidine	0.15	ug/L	>1.4	>1.4	>1.4
2,4-Dichlorophenol	110	ug/L	>1.4	>1.4	>1.4
Diethylphthalate	29000	ug/L	>1.4	>1.4	>1.4
2,4-Dimethylphenol	730	ug/L	>1.4	>1.4	>1.4
Dimethylphthalate	370000	ug/L	>1.4	>1.4	>1.4
Di-n-butylphthalate	0.037	ug/L	>1.4	>1.4	>1.4

Project E091380

Water - Chemical Results
City of Charleston CSX Trestle

Chemicals of Concern	De Minimis	Units	MW-1	MW-2	MW-3
4,6-Dinitro-2-methylphenol	0	ug/L	>3.6	>3.4	>3.4
2,4-Dinitrophenol	73	ug/L	>3.6	>3.4	>3.4
2,4-Dinitrotoluene	73	ug/L	>1.4	>1.4	>1.4
2,6-Dinitrotoluene	37	ug/L	>1.4	>1.4	>1.4
Di-n-octylphthalate	6	ug/L	>1.4	>1.4	>1.4
bis(2-Ethylhexyl)phthalate	6	ug/L	>1.4	>1.4	>1.4
Fluoranthene	1500	ug/L	>1.4	>1.4	>1.4
Fluorene	240	ug/L	>1.4	>1.4	>1.4
hexachloro-1,3-butadiene	0.86	ug/L	>1.4	>1.4	>1.4
Hexachlorobenzene	1	ug/L	>1.4	>1.4	>1.4
Hexachlorocyclopentadiene	50	ug/L	>1.4	>1.4	>1.4
Hexachloroethane	4.8	ug/L	>1.4	>1.4	>1.4
Indeno(1,2,3-cd)pyrene	180	ug/L	>1.4	>1.4	>1.4
Isophorone	71	ug/L	>1.4	>1.4	>1.4
2-Methylnaphthalene	92	ug/L	>1.4	>1.4	>1.4
2-Methylphenol(o-Cresol)	1800	ug/L	>1.4	>1.4	>1.4
3&4-Methylphenol(m&p Cresol)	180	ug/L	>2.9	>2.7	>2.8
Napthalene	6.2	ug/L	>1.4	>1.4	>1.4
2-Nitroaniline	110	ug/L	>3.6	>3.4	>3.4
3-Nitroaniline	0	ug/L	>3.6	>3.4	>3.4
4-Nitroaniline	110	ug/L	>3.6	>3.4	>3.4
Nitrobenzene	3.4	ug/L	>1.4	>1.4	>1.4
2-Nitrophenol	290	ug/L	>1.4	>1.4	>1.4
4-Nitrophenol	290	ug/L	>1.4	>1.4	>1.4
N-Nitrosodimethylamine	0.0013	ug/L	>1.4	>1.4	>1.4
N-Nitroso-di-n-propylamine	0.0096	ug/L	>1.4	>1.4	>1.4
N-Nitrosodiphenylamine	14	ug/L	>1.4	>1.4	>1.4
Pentachlorophenol	1	ug/L	>3.6	>1.4	>3.4
Phenanthrene	1800	ug/L	>1.4	>1.4	>1.4
Phenol	11000	ug/L	>1.4	>1.4	>1.4
Pyrene	180	ug/L	>1.4	>1.4	>1.4
1,2,4-Trichlorobenzene	70	ug/L	>1.4	>1.4	>1.4
2,4,5-Trichlorophenol	3700	ug/L	>3.6	>3.4	>3.4
2,4,6-Trichlorophenol	6.1	ug/L	>1.4	>1.4	>1.4

Sample result above De Minimus value.

Sample result above detection limit, but below De Minimis Value.